BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
	)	
Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2590 MHz Bands	)	WT Docket No. 03-66 RM-10586
	)	
Part 1 of the Commission's Rules - Further Competitive Bidding Procedures	)	WT Docket No. 03-67
	)	
Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and the Instructional Television Fixed Service	)	MM Docket No. 97-217
Amendment of Parts 21 and 74 to Engage in Fixed Two-Way Transmissions,	)	
Amendment of Parts 21 and 74 of the Commission's Rules With Regard to Licensing in the Multipoint Distribution Service and in the Instructional Television Fixed Service for the Gulf of Mexico	)	WT Docket No. 02-68 RM-9718

COMMENTS OF ERICSSON INC

Ericsson Inc ("Ericsson") hereby submits comments in response to the Federal Communications Commission's ("Commission") Notice of Proposed Rulemaking, released April 2, 2003, to facilitate provision of high-speed wireless Internet access services and mobile radio services in the 2500-2690 MHz band ("NPRM"). The Commission's proposals would limit some or all of the radio signals transmitted by Multipoint Distribution Service ("MDS"), Multichannel Multipoint Distribution Service ("MMDS") and Instructional Television Fixed Service ("ITFS") operators (collectively referred to as "the Services") to levels that would make it possible to provide two-way,

low-power cellular systems in adjacent service areas. Among other things, the Commission seeks comment on the possible reconfiguration of the 2500-2690 MHz band, as well as the best means of licensing operations, technical and service rules for the band, and other changes to existing rules and procedures governing operations in the band.

Ericsson agrees with the Commission's assessment that the rules and policies governing the Services are in need of a comprehensive examination, and indeed, extensive modification. The transformation of the telecommunications industry has rendered the current rules and procedures overly burdensome, and in many instances, obsolete. Ericsson commends the Commission for recognizing that changes are now necessary for the advancement of wireless broadband services, in conjunction with continued promotion of educational services.

In response to the Commission's request, Ericsson makes the following specific comments:

- Changes to existing rules and procedures governing operations in this band should facilitate two-way, low-power cellular systems;

- Global spectrum allocations are an essential step for continued development and deployment of a wide variety of products and applications. Therefore, it is critical that the Commission take into account the international impact of its rules, in order to ensure benefits on a global scale;

- Any regulatory scheme should be flexible enough to encourage licensees to develop their spectrum for novel and innovative uses, yet provide enough certainty to enable them to plan current and future uses of licensed spectrum. This includes implementation of rules in this band that are modeled, as closely as practicable, on the PCS service rules. The PCS model has proven to be extremely effective in encouraging the efficient use of spectrum and the development of competitive markets;

- MDS in the 2150-2160/2162 MHz range should be relocated to comparable spectrum, in order to ensure that contiguous spectrum is available for advanced wireless service in the 2110-2155 MHz band, as well as to allow for more capacity in the downlink direction;

- Flexible secondary market policies would obviate the need for the Commission to permit unlicensed underlay operations in the band.

Ericsson believes that the foregoing will enable the Commission to accomplish its objectives of ensuring efficient use of spectrum, encouraging competition and innovation in wireless broadband services, and promoting educational services.

DISCUSSION

I. THE BAND PLAN SHOULD BE MODIFIED.

As the Commission and the Coalition have both acknowledged, the band is not presently being used as originally envisioned, and rule changes are necessary to allow new and innovative services to develop.[1] Accordingly, the Coalition recommends a new band plan that is designed to make better use of the spectrum. The Coalition recommends that the new band plan provide for advanced low-power, two-way broadband systems, while also protecting existing high-power systems.[2] As the Commission notes, many operators believe that cellularized two-way systems "are more spectrally efficient than high-powered systems, can support provision of high-data-rate services to a large number of subscribers, can help overcome obstacles to line-of-sight service, and can more readily support mobile or portable services."[3]

Specifically, the Coalition proposes to split the band into three segments, segregating low-power and high-power operations in order to avoid mutual interference.[4] Ericsson supports separating these operations, which is consistent with the FCC's

[1] NPRM at ¶ 1.
[2] NPRM at ¶ 30.
[3] NPRM at ¶ 26.
[4] NPRM at ¶ 31.

Spectrum Policy Task Force (the "Task Force") Recommendations,[5] would maintain the original ITFS mission, and would be compatible with advanced wireless services ("AWS") in this band.

A. The Commission Should Consider Global Implications.

Ericsson encourages the Commission, as it analyzes a new band plan, to consider the global implications of whatever actions it takes. As the Commission is aware, the 2000 World Radiocommunication Conference identified the 2500-2690 MHz band, among other bands, for possible use by International Mobile Telecommunications-2000 ("IMT 2000") systems.[6] Global allocations of bands of this nature are critical to the continued development and deployment of a wide variety of products and applications, including AWS. Global harmonization of policy is an important element of effectively achieving the benefits of roaming, reduced complexity of equipment, affordability of devices, and economies of scale.

Specifically, the frequency arrangement proposed by the Coalition allows uplink and downlink to coexist in both the lower and upper band segments, which eliminates the need to specify the FDD mobile station transmit direction (upstream) or the base station transmit direction (downstream). Furthermore, not specifying the duplex direction will allow market forces to determine the types of systems that can operate in this band, which is also consistent with global initiatives. In addition, sufficient flexibility should be granted to allow spectrum pairing with bands outside 2.5 GHz. One possibility, for example, would be the pairing of uplink spectrum in the PCS band with downlink spectrum in the 2.5 GHz band, which would allow new services and increase spectrum

[5] *See* FCC Staff Report, *Spectrum Policy Task Force Report*, ET Docket No. 02-135, November 2002 ("Task Force Report")
[6] NPRM at ¶ 11.

capacity. Ericsson believes that the Coalition's band plan, with this additional flexibility, properly takes into consideration international implications, and will thus help ensure advancements on a global level.

B. The Commission Should Allocate Spectrum In A Manner That Best Promotes Viable Uses of Spectrum.

The appropriate allocation of spectrum for both licensed and unlicensed services is the key to limiting harmful interference and to ensuring the development of commercially viable uses of spectrum. Another essential component to promoting spectrum efficiency and increasing usage is the grouping of like spectrum 'neighbors' by technically compatible characteristics.[7] Some spectrum is more suitable for particular services because of its fundamental propagation characteristics. Ericsson urges the Commission to take into consideration the particular capabilities, applications, spectrum use properties, and the spectrum requirements of devices when making its allocation decisions.

Generally, Ericsson encourages the Commission to keep unlicensed spectrum use segregated from licensed use. Ericsson believes that it is better to allocate the lower frequency bands for wide-area licensed applications and higher bands for unlicensed applications. Unlicensed products and applications, operated in the appropriately designated spectrum, are important to consumers and businesses alike because they contribute to increased efficiency and productivity. For similar reasons, devices and applications operating in licensed spectrum are also important. Accordingly, the Commission should balance its efforts to make both licensed and unlicensed spectrum

[7] Task Force Report at 4.

available to ensure that the public has access to a full range of wireless products and services.

Ericsson also believes that the "exclusive use" model is the preferred approach for this band, whereby a licensee has exclusive and transferable rights to the use of specified spectrum. The exclusive use model provides licensed users with the certainty and predictability necessary to encourage continued investment and innovation. Licensees must be able to depend on the fact that their operations will be free from interference in order to move forward while investing significant resources. Already, sufficient market forces are in place to encourage the most efficient use of the licensed spectrum, including permitting other users to operate in unused spectrum via secondary markets, if licensees believe that such use would not impair their operations.[8]

C. The Commission Should Adopt A Geographic Area Licensing Approach.

Ericsson agrees with the Coalition's conclusion that the site-by-site licensing system is too cumbersome and costly, and as such, is impeding competition and advancement of next generation technology. Ericsson supports a geographic area licensing approach, including for unassigned ITFS spectrum. As noted by the Commission, such a licensing system would give licensees much greater flexibility to respond to market demand, and may significantly improve spectrum utilization.[9]

Ericsson further urges the Commission to permit aggregation and disaggregation of spectrum blocks and service areas, essentially allowing the market to devise spectrum

[8] Similarly, Ericsson agrees with the Commission's belief that eligibility restrictions and strict spectrum aggregation limits ("spectrum caps") are not necessary, given the state of competition in the industry. Ericsson believes that opening up the band to as wide a range of applicants as possible would, indeed, "encourage entrepreneurial efforts to develop new technologies and services, while helping to ensure efficient use of this spectrum." NPRM at ¶ 128.

[9] NPRM at ¶ 62.

configurations that meet the needs of industry. Freely operating market forces would ensure the diversity of services offered to consumers, the adequacy of spectrum for flexible uses, and the ability of small business to provide niche services. In particular, Ericsson encourages the Commission to permit aggregation of rural and urban service areas, which would lead to service areas that permit nationwide coverage. Aggregation of service areas is especially important for ensuring that development of AWS in this band is not hampered, especially in rural areas. The ability to aggregate licenses or disaggregate service areas (*i.e.*, to permit spectrum trading) would allow for a tailored service area without sacrificing less populated ones.

II. RULES GOVERNING SPECTRUM USE SHOULD BALANCE FLEXIBILITY WITH THE NEED FOR REGULATORY CERTAINTY.

Any regulatory scheme adopted by the Commission should have enough flexibility for spectrum use that it will encourage innovation and investment. Nevertheless, it should not be so permissive that unwanted consequences follow. As the Commission recognizes, increased flexibility with respect to spectrum use allows "market forces and educational needs to move spectrum to its highest valued use."[10] At the same time, the Commission must also recognize that flexibility must be balanced, or it could impair the rights and the ability to offer services of some operators in the spectrum. Ericsson supports a balanced approach that maximizes efficiency and flexibility with equipment simplicity.

For example, if the Commission were to permit uncoordinated deployment of different spectrum access technologies, large guard bands or other onerous technical specifications would be required. Such a result would work against the efficient use of

[10] NPRM at ¶ 39.

spectrum, as well as undermine the Coalition's goals in providing for flexible use of the spectrum. It would not foster industry confidence, which is critical for continued industry investment in the development of this spectrum.

A. The Commission Should Adopt A Regulatory Approach For AWS In the 2.5 GHz Band That Is Similar To The PCS Service Rules.

Ericsson recommends that the Commission adopt a regulatory approach for AWS in the 2.5 GHz band that is similar to its PCS service rules. The PCS model has proven to be extremely effective in encouraging the efficient use of spectrum and the development of competitive markets. The Commission's experience in regulating PCS services illustrates particularly well the positive impact of flexibility in service rules. Flexibility serves to encourage industry investment, promote competition, and foster technological innovations. In order to maximize the efficient and intensive use of the band, the Commission should adopt a similar approach for AWS in the 2.5 GHz band.

In general, Ericsson recommends that the Commission adopt rules that are not overly onerous or restrictive, and that are technology neutral. Ericsson believes that the Commission should simplify the rules governing the band so that there are no overly burdensome requirements, but at the same time, minimize harmful interference to licensed users. As discussed, Ericsson believes that the rules governing PCS are good guidance. For example, devices in this band should be required to conform to standards used for PCS with respect to RF exposure and safety procedures.

In addition, because of the potential benefits of global harmonization and the potential resulting economies of scale, Ericsson underscores the need for the Commission to consider the international impact of its service rules. In this way, the Commission will ensure that many of the significant promises of AWS, such as ubiquitous, globally

harmonized services, and all of the attendant benefits of global markets, are realized to the fullest extent possible.

B. Other Technical Issues.

Ericsson offers the following comments on other issues raised by the Commission:

- Ericsson supports the Commission's conclusion that to ensure that contiguous spectrum is available for AWS in the 2110-2155 MHz band, and to allow for more capacity in the downlink direction, it is necessary to relocate MDS from 2150-2160/2162 MHz, and provide comparable relocation spectrum;

- The Commission seeks comment on whether it should establish formal channel pairings to standardize the separation between channels used in upstream and downstream equipment. Ericsson believes that variable duplex technology will provide significant flexibility in the channel pairings; however, there should be limits to the number of pairings, in order to reduce equipment complexity, testing requirements and equipment validation;

- The Commission seeks comment on a requirement that subscriber handsets not transmit unless a base station pilot is present. Current terminals in the PCS band avoid transmitting with high power if a base station pilot is unavailable. However, in the case of a dedicated pilot, a situation could arise in which the terminal receives pilot signals in a non-continuous fashion, but transmits continuously. Although the transmission would only be for short periods without a pilot being present, such a scenario would be in technical violation of such a rule, but nevertheless should be allowed.

III. THE COMMISSION SHOULD NOT PERMIT UNLICENSED "UNDERLAY" OPERATIONS.

The Commission seeks comment on whether and how it should allow the band to be used by certain unlicensed devices that would operate at very low power levels. It has been suggested that such devices, theoretically, might not cause interference to licensed operations in the same band.[11] Ericsson believes that allowing such unlicensed "underlay" operations would, in fact, prove harmful to licensed operations. Not only

[11] NPRM at ¶ 143.

would such operations impose onerous financial and technical burdens, but it would also introduce a significant element of uncertainty that would be detrimental to the development of services in the band.

A. Permitting Unlicensed Underlay Operations Would Impose Unfair Financial and Technical Burdens Upon Licensed Operators.

Introduction of additional interfering signals from unlicensed underlay operations in the band, including from the aggregation of unlicensed devices, has the potential to degrade the operations of licensed devices, as well as possibly disrupt services[12]. Moreover, the introduction of additional interference will prove to be financially costly to licensees. For example, presently, license holders typically design their systems to operate down to the noise floor, one indication of spectrum efficiency. By introducing additional unlicensed devices into the band, the noise floor would necessarily rise. As a result, devices designed to operate in the original noise floor would need potentially major modifications, or they would possibly be rendered obsolete. In either case, it would represent a significant cost burden on the licensee. The rising noise floor would also require operators to install additional base stations just to cover the same geographical area. Again, this would be costly for licensees.

The Task Force has recognized that allowing underlay operations would most likely call for a way of measuring and controlling interference.[13] Indeed, the Task Force has proposed as one possibility the use of a metric that would quantify levels of interference, or measure the "interference temperature," and set limits beyond which an

[12] *See* Spectrum Policy Task Force Technology Advisory Council (TAC) Briefing (December 2002)

[13] Task Force Report at 25-26.

unlicensed device could not operate without the licensee's permission.[14] Such an approach would be intended to ensure that licensees could operate without the danger of interference from underlay devices. To implement such a concept, the Task Force suggests the utilization of smart receivers that have the ability to monitor the actual RF environment and adapt their transmission techniques and power levels to real-time environments, according to each band of operation and for each geographical region or service that would be expected to operate.[15]

Beyond the basic issue of how to enforce an "interference temperature" policy, as well as the need to maintain a database accessible by devices while roaming from one band to another, the technology to implement such a plan is not currently available. In addition, the industry simply does not have enough technical data on the noise floor, or how it might quantify the interference environment in order to implement such a metric as the "interference temperature." Adding to this technical challenge is the dynamic nature of the RF environment, and the fact that the location of a mobile device is by its nature very unpredictable. As a result, interference levels fluctuate on a constant basis. Thus, it is far from certain that a technical solution with respect to monitoring interference levels is even possible, much less economically viable.[16] At a minimum, much more research is necessary before any standard for interference temperature could realistically be developed, adopted, and enforced.

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[14] *Id*. at 27-28.
[15] *Id.*
[16] While Software Defined Radio technology could someday play a larger role in wireless systems, the technology is still very much in the developmental stage, and remains far away from commercial availability.

B. Permitting Unlicensed Underlay Operations Would Introduce Unpredictability Which Would Be Detrimental To The Industry.

Ultimately, spectrum policy and regulations must be developed with an eye toward providing businesses with stability, predictability, and transparency. Businesses must be able to plan current and future uses of their licensed spectrum, including developing the spectrum for novel ideas and products. However, in order for businesses to feel comfortable enough to maximize capital investment, coordinate service expansion, and develop new products and technology, they must be able to rely upon a consistent regulatory environment in which they can be assured that they will be able to use all licensed spectrum in a stable and uninterrupted manner. Predictability of the operating environment is critical to licensee confidence, and allowing unlicensed underlay use will undermine it. Regulatory uncertainty for this particular band, which is only in its infancy with respect to AWS, would be detrimental to progress, and would most likely devalue the spectrum. Such a result would be particular unfortunate, since the 2000 World Radiocommunication Conference has identified the 2.5 GHz band as suitable for global mobile terrestrial allocation. Thus, goals of global roaming and global economies of scale would be frustrated by a policy that permits unlicensed operations in the band.

There are already strong market forces in place that create incentives for commercial operators to maximize spectral efficiency in the 2.5 GHz band. Ericsson believes that continuing to allow the market to dictate use of the spectrum is the preferred path to follow. Furthermore, adopting secondary market policies that would provide flexibility for licensees to accommodate other operations would not only allow licensees to control use of its spectrum, but would also allow licensees to increase the value of its spectrum. Therefore, Ericsson strongly urges the Commission to allow the industry, and

secondary markets in particular, to determine what additional operations can take place in the licensed spectrum, rather than allowing unlicensed underlay operations to take place.

CONCLUSION

The Commission has the opportunity to establish rules for an unprecedented amount of spectrum that, if properly utilized, has the potential to deliver promising new technology and valuable services for people across the country, and indeed, the world. As such, the Commission must be cautious as it proceeds with establishing the appropriate allocations, and the rules and procedures that govern operations in the band. The Commission's policies should be transparent, coordinated, and harmonized both domestically and internationally, supporting goals of global roaming, economies of scale, innovation and increased services. The rules governing spectrum use for the band must be clear, stable, and well-defined -- regulatory uncertainty in this arena can only undermine its value. At the same time, the Commission's rules should provide industry participants with enough flexibility to encourage a cooperative approach to resolving issues such as use and interference. The proper balancing of all of these considerations, as reflected in Ericsson's comments, will help make the promises of advanced wireless services a reality.

Respectfully submitted this 8th day of September 2003.

Mark Racek
Director, Spectrum Policy
Ericsson Inc
Office of Public Affairs
1634 I Street, N.W., Suite 600
Washington, D.C. 20006-4083
Telephone: (202) 783-2200
Facsimile: (202) 783-2206

Ho Sik Shin
Elisabeth H. Ross
Birch, Horton, Bittner & Cherot
1155 Connecticut Avenue, N.W.
Suite 1200
Washington, D.C. 20036
Telephone: (202) 659-5800
Facsimile: (202) 659-1027